

WHAT IS CLAIMED IS:

1. A method for providing dynamic adjustment of frame encoding
5 parameters to improve transmission performance for a transmitting
frame being transmitted from a transmitting station to a
receiving station over a transmission medium on a frame-based
communications network, the transmitting frame having a header
10 segment and a payload segment, the header segment being
transmitted using a fixed set of encoding parameters, the payload
segment being transmitted using a variable set of payload
encoding parameters, comprising:

the transmitting station sending the transmitting frame
using one set of the variable set of payload encoding parameters
15 at a time;

the receiving station:

receiving and decoding the header segment of each
transmitting frame,

performing a decode process on the payload segment of
20 each transmitting frame, and either decoding the payload segment
without errors wherein the frame is considered successfully
received, or detecting an error occurrence in the decode process,

measuring and tracking the performance of the frame
decode process,

25 determining network performance characteristics for
establishing desired performance based upon measuring and
tracking the performance of the frame decode process, and

indicating to the transmitting station changes to the
payload encoding parameters based upon determining network
30 performance improvement characteristics; and

the transmitting station changing the one set of the
variable set of payload encoding parameters corresponding to the
changes to the payload encoding parameters indicated to the
transmitting station for encoding next future transmitting
35 frames.

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2. The method of Claim 1, wherein the indicating includes
transmitting rate request control frames from the receiving
5 station back to the transmitting station, said rate request
control frames specifying desired payload encoding parameters.

3. The method of Claim 2, wherein the indicating further
includes controlling the number of rate request control frames
10 transmitted.

4. The method of Claim 1, wherein, for a network that supports
multiple data rates, the encoding parameters specify a rate at
which the payload segment is transmitted.

5. The method of Claim 1, wherein the fixed set of encoding
parameters is indicative of a base rate by which all stations can
receive and decode the transmitting frame with a least likelihood
of errors.

6. The method of Claim 1, wherein the one set of the variable
set of payload encoding parameters is selected from a group of
multiple sets of encoding parameters.

7. The method of Claim 1, wherein improved transmission
performance is provided by determining optimal network
performance characteristics.

8. The method of Claim 7, wherein optimal network performance
characteristics include decreased error amount or increased speed
of transmission.

9. The method of Claim 4, wherein the payload encoding
parameters control a number of bits transmitted per symbol.

10. The method of Claim 4, wherein the payload encoding parameters control a number of symbols transmitted per second.

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11. The method of Claim 2, wherein the receiving station indicates new payload encoding parameters by transmitting the rate request control frame back to the transmitting station with the new parameter encoding parameters being indicated in a payload segment of the rate request control frame, the payload segment of the rate request control frame being transmitted using the fixed set of encoding parameters.

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12. The method of Claim 11, wherein the fixed set of encoding parameters is indicative of a base rate by which all stations can receive and decode the transmitting frame with a least likelihood of errors.

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13. The method of Claim 3, wherein the receiving station limits the number of rate request control frames sent during a given time interval.

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14. The method of Claim 2, wherein the receiving station sends the rate request control frame in response to reception of a transmitting frame from the transmitting station encoded with payload encoding parameters that do not match preferred payload encoding parameters selected by the receiving station.

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15. The method of Claim 2, wherein the receiving station sends a rate request control frame in response to reception of some fixed number of frames from the transmitting station encoded with payload encoding parameters that do not match preferred payload encoding parameters selected by the receiving station.

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16. The method of Claim 2, wherein the receiving station sends
a rate request control frame in response to receiving some
5 variable number of frames from the transmitting station encoded
with payload encoding parameters that do not match preferred
payload encoding parameters selected by the receiving station,
the variable number of such frames between successive
transmissions of rate request control frames being a function of
10 a number of non-matching frames received.

17. The method of Claim 16, wherein the function of a number of
non-matching frames received is a binary exponential backoff with
an upper limit on a range of the binary exponential backoff.

18. The method of Claim 6, where the payload parameters
indicated to the transmitting station may include parameters that
may not be useable by the transmitting station.

19. The method of Claim 18, wherein the payload encoding
parameters indicated to the transmitting station include an
indication of preference such that the transmitting station
should use a most preferred parameter set of which it is capable.

20. The method of Claim 2, wherein the receiving station sends
a payload selection frame periodically even if no transmitting
frames were received that had been transmitted using undesired
payload encoding parameters.

21. A method for providing dynamic adjustment of frame encoding
parameters to improve transmission performance for a transmitting
frame being transmitted from a transmitting station to a
receiving station over a transmission medium on a frame-based
communications network, the frame-based communication network
35 including a plurality of stations, each station having a unique

address, the unique address being used as a source address for transmitting frames being transmitted by the station, and as a destination address for frames transmitted by other stations to be received solely by the station, the transmitting frame including a header segment and a payload segment, the header segment containing a source address and a destination address, the header segment further being transmitted using a fixed set of encoding parameters, the payload segment being transmitted using a variable set of payload encoding parameters, comprising:

15 a transmitting station sending the transmitting frame, the transmitting frame containing a transmitting station address as the source address and a desired destination address, the transmitting station using one set of variable set of payload encodings at a time for the desired destination address,

a receiving station, using the destination address in the transmitting frame to receive frames:

20 receiving and decoding the header segment of each transmitting frame,

performing a decode process on the payload segment of each transmitting frame, and either decoding the payload segment without errors wherein the frame is considered successfully received, or detecting an error occurrence in the decode process,

25 measuring and tracking the performance of the frame decode process for transmitting frames sent by the transmitting station,

determining network performance characteristics for establishing desired performance based upon measuring and tracking the performance of the frame decode process, and

30 indicating to a transmitting station having sent the transmitting frame to the destination address changes to the payload encoding parameters based upon determining network performance improvement characteristics; and

35 the transmitting station having sent the transmitting frame

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to the destination address changing the one set of the variable
set of payload encoding parameters according to the changes to
5 the payload encoding parameters indicated to the transmitting
station by the receiving station for encoding next future
transmitting frames.

22. The method of Claim 21, wherein the indicating includes
10 transmitting rate request control frames from the receiving
station back to the transmitting station, said rate request
control frames including the destination address used by the
receiving station to receive the transmitted frame and specifying
desired payload encoding parameters.

23. The method of Claim 22, wherein the indicating further
includes controlling the number of rate request control frames
transmitted.

24. The method of Claim 21, wherein, for a network that supports
multiple data rates, the encoding parameters specify a rate at
which the payload segment is transmitted.

25. The method of Claim 21, wherein the fixed set of encoding
25 parameters is indicative of a base rate by which all stations can
receive and decode the transmitting frame with a least likelihood
of errors.

26. The method of Claim 21, wherein the one set of the variable
30 set of payload encoding parameters is selected from a group of
multiple sets of encoding parameters.

27. The method of Claim 21, wherein improved transmission
performance is provided by determining optimal network
35 performance characteristics.

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28. The method of Claim 27, wherein optimal network performance characteristics include decreased error amount or increased speed
5 of transmission.

29. The method of Claim 24, wherein the payload encoding parameters control a number of bits transmitted per symbol.

10 30. The method of Claim 24, wherein the payload encoding parameters control a number of symbols transmitted per second.

31. The method of Claim 22, wherein the receiving station indicates new payload encoding parameters by transmitting the rate request control frame back to the transmitting station with the new parameter encoding parameters being indicated in a payload segment of the rate request control frame, the payload segment of the rate request control frame being transmitted using the fixed set of encoding parameters.
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20 32. The method of Claim 31, wherein the fixed set of encoding parameters is indicative of a base rate by which all stations can receive and decode the transmitting frame with a least likelihood of errors.

25 33. The method of Claim 23, wherein the receiving station limits the number of rate request control frames sent during a given time interval.

30 34. The method of Claim 22, wherein the receiving station sends the rate request control frame in response to reception of a transmitting frame from the transmitting station encoded with payload encoding parameters that do not match preferred payload encoding parameters selected by the receiving station.
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35. The method of Claim 22, wherein the receiving station sends
a rate request control frame in response to reception of some
5 fixed number of frames from the transmitting station encoded with
payload encoding parameters that do not match preferred payload
encoding parameters selected by the receiving station.

36. The method of Claim 22, wherein the receiving station sends
10 a rate request control frame in response to receiving some
variable number of frames from the transmitting station encoded
with payload encoding parameters that do not match preferred
payload encoding parameters selected by the receiving station,
the variable number of such frames between successive
15 transmissions of rate request control frames being a function of
a number of non-matching frames received.

37. The method of Claim 36, wherein the function of a number of
non-matching frames received is a binary exponential backoff with
20 an upper limit on a range of the binary exponential backoff.

38. The method of Claim 26, where the payload parameters
indicated to the transmitting station may include parameters that
may not be useable by the transmitting station.

25 39. The method of Claim 38, wherein the payload encoding
parameters indicated to the transmitting station include an
indication of preference such that the transmitting station
should use a most preferred parameter set of which it is capable.

30 40. The method of Claim 22, wherein the receiving station sends
a rate request control frame periodically even if no transmitting
frames were received that had been transmitted using undesired
payload encoding parameters.

41. The method of Claim 21, wherein in addition to unique destination addresses for each station, the frame-based communications network includes multicast destination addresses such that frames with a multicast destination address may be received by a plurality of stations,

each transmitting station:

10 sending frames to a plurality of receiving stations using a multicast destination address, and further encoding frames sent to the multicast destination address using a set of payload encoding parameters maintained specifically for use with the multicast destination address;

each receiving station:

15 upon receiving a frame with a multicast destination address performing header reception, payload decoding, error detection, reception quality measurement tracking, and indicating the multicast address used by the transmitter as the destination address of transmitted frames; and

20 each transmitting station, upon receiving indications of desired payload encoding parameters from a plurality of receiving stations, determining a best set of parameters for sending transmitting frames to all of the receiving stations from which it has received payload encoding parameter indications.

25 42. The method of Claim 23, wherein a receiving station for a multicast destination address sends desired payload encoding parameters for the multicast destination address periodically back to the transmitting station, the period being common to all receivers, and the transmitting station, using a timer with common period as that of the receiving stations, keeps track of which receiving stations have recently sent payload encoding parameter indications for the multicast destination address, and the transmitting station, using recently received payload encoding parameter information, determines the payload encoding

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parameters to use for the multicast destination address.

5 43. The method of Claim 24, wherein a periodic transmission of rate request control frames is suppressed if the receiving station has itself sent a transmitting frame to the multicast destination address.

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